REMARKS

The specification and drawings have been amended to correct minor errors noted in the Office Action and otherwise.

Claims 1, 9, 17, 19, and 20 have been amended to further particularly point out and distinctly claim subject matter regarded as the invention. The amendments here presented are made for the purposes of better defining the invention, rather than to overcome the rejections for patentability. Support for the amendments herein presented can be found in the specification and claims as filed. No new matter has been introduced as a result of the amendments. Reconsideration and allowance is respectfully requested in view of the amendments and the following remarks.

Objections

The specification has been amended to correct the reference to FIG. 28.

The FIG. 27 has been amended to correct the numeral "18" and provide the proper reference numeral "118." Entry of the amendments is respectfully requested.

The 35 U.S.C. § 112 Rejection

Claims 1-36 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter applicant regards as the invention. This objection is respectfully traversed.

The Office Action asserts that claims 1, 9, 19, and 20 lack structural support. It was not understood by the Examiner, what structure was claimed and what a protrusion is or what direction the protrusion extends. Applicants respectfully disagree with the assertions in the Office Action. The independent claim 1 has been amended to more clearly claim the invention. Structural limitations are provided in the claims. The term

protrusion is used within ordinary meaning and is well supported in the specification and drawings. The protrusion location in relationship to other structure is claimed as well.

The Office Action asserts with regard to claims 7, 8, 15 and 16 that it is not understood how the protrusion can be electrically isolated from the conductive plane. The configuration of the protrusion and conductive plane is clearly described in the specification at least at page 5, third paragraph, page 13, second paragraph, the paragraphs bridging pages 40-41 and 41-42 as well as FIG. 26A.

The Office Action asserts that claims 9 and 17 have an indefinite phrase "associated with." The claims have been amended.

The Office Action asserts that claims 18 and 30 have an indefinite term "adjacent." Applicants respectfully disagree with the assertion. The term adjacent is well understood in the art and is used in the normal context of the meaning. The specification discloses the special relationship of the elements claimed and is within the meaning in the art.

A claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. *In re Swunehart*, 160 USPQ 226 (CCPA 1971).

The Office Action asserts that claim 20 recites "said transverse slot" and that there is insufficient antecedent basis. Claim 20 has been amended and is in condition for allowance.

With this amendment it is respectfully submitted the claims satisfy the statutory requirements.

The 35 U.S.C. § 103 Rejection

Claims 1-29 stand rejected under 35 U.S.C. § 103 as being allegedly unpatentable over Claisse et al. (U.S. Patent No. 6,084,900) in view of Sun et al. (U.S. Patent No. 5,915,165). This rejection is respectfully traversed.

In the Office Action at paper number 6, the Office Action asserts with regard to claim 1, that Claisse et al. teach in Figure 2 an optical apparatus comprising a conductive plane 30 having an aperture 51. The Office Action admits that Claisse et al. do not teach a protrusion. The Office Action asserts that Sun et al. teach in Figure 6 that multiple aperture shapes are shown. The Office Action asserts that it would have been obvious to alter the aperture shape in Claisse et al. as taught by Sun et al. to limit the light emission to a particular mode and that adding a protrusion would alter the shape of the aperture. The Office Action asserts that adding a protrusion would alter the shape of the aperture. Applicants respectfully disagree with the assertions in the Office Action.

The Claisse et al. reference merely teaches an array of annular waveguide VCSEL's for achieving a stable single high order mode light source. Each VCSEL defines an annular emission region through which light generated by the annular waveguide VCSEL is emitted. There are a plurality of annular waveguides in the array, each waveguide emitting a single high order mode of a wavelength different than the other VCSEL devices in the array. The Claisse et al. reference is silent as to the shape or pattern of the annular emission region, contact layer or non-lasing area.

The Sun et al. reference merely teaches a vertical cavity surface emitting laser with accurately defined and controlled aperture which directs the current path within the laser. The Sun et al. reference teaches a process to form the aperture by pre-oxidation layer disordering which produces highly reproducible optical and electrical

characteristics. The Sun et al. reference at FIG. 6 shows anisotropic apertures 136, 138 and 140 of virtually any other shape. The Sun et al. reference teaches that the Sun et al. invention can be formed into any arbitrary shape or size in contrast to previous methods that produce jagged uneven boundaries. The Sun et al. reference is silent with regard to altering the aperture for a particular mode. The Sun et al. reference does not teach or suggest a protrusion. (A)

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Establishing a *prima facie* case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 USPQ 494, 496 (C.C.P. A. 1970).

The combination of Claisse et al. with Sun et al. fails to claim each and every claimed element. There is no near field optical apparatus comprising a conductive layer defining an aperture therein, said aperture having a perimeter said conductive layer having at least one protrusion extending into said aperture at said perimeter, wherein said protrusion into said aperture is configured to produce a transmission mode with very high throughput at least as claimed in Claim 1. The vague and generalized teaching in the Sun et al. reference regarding any arbitrary shape fails to rise to the level of teaching or suggesting the claimed elements. Neither of the references teaches nor suggests the element of a protrusion into the aperture. Since each and every claimed element is not taught or suggested in the prior art, then there is no *prima facie* case of obviousness.

Regarding Claim 9, the Office Action asserts that the Claisse et al. reference teaches in figure 2 an optical apparatus comprising a light source 22 and a conductive

plane 30 having an aperture 51. The Office Action admits that the Claisse et al. reference does not teach a protrusion. The Office Action asserts that Sun et al. teach in figure 6 that multiple aperture shapes are known. The Office Action asserts that it would have been obvious to alter the aperture shape in Claisse et al. as taught by Sun et al. to limit the light emission to a particular mode. The Office Action asserts that adding a protrusion would alter the shape of the aperture. The Office Action fails to assert that a protrusion extends into the aperture is taught or suggested.

The prior art combination of the Claisse et al. reference with the Sun et al. reference fails to teach each and every claimed element. The prior art combination does not teach or suggest a near field optical apparatus, comprising a light source; a conductive plane proximate to said light source, said conductive plane having an aperture therein positioned such that light from said light source passes through said aperture, said conductive plane including at least one protrusion which extends into said aperture, wherein said protrusion extending into said aperture forms an aperture shape that produces very high light throughput, at least as claimed in Claim 9. Since each and every claimed element is not taught or suggested in the prior art, then there is no *prima facie* case of obviousness.

Regarding Claim 19, the Office Action asserts that Claisse et al. teach at figure 2 a semiconductor laser apparatus comprising an emission facet having a conductive surface 20 wherein said conductive surface has an aperture 51 therein. The Office Action admits that the Claisse et al. reference does not teach a protrusion. The Office Action asserts that Sun et al. teach in figure 6 that multiple aperture shapes are known. The Office Action asserts that it would have been obvious to alter the aperture shape in Claisse et al. as taught by Sun et al. to limit the light emission to a particular mode. The Office Action asserts that adding a protrusion would alter the shape of the aperture.

The prior art combination of the Claisse et al. reference with the Sun et al. reference fails to teach each and every claimed element. The prior art combination does not teach or suggest a semiconductor laser apparatus comprising an emission facet having a conductive surface, said conductive surface having an aperture therein, said conductive surface including at least one protrusion extending into said aperture, said at least one protrusion and said aperture configured to produce a transmission mode with very high throughput, at least as claimed in Claim 19. Since each and every claimed element is not taught or suggested in the prior art, then there is no *prima facie* case of obviousness.

Regarding Claim 20, the Office Action asserts that Claisse et al. teach at figure 2 an optical apparatus comprising a conductive plane 30 having an aperture 51 therein. The Office Action admits that the Claisse et al. reference does not teach a protrusion. The Office Action asserts that Sun et al. teach in figure 6 that multiple aperture shapes are known. The Office Action asserts that it would have been obvious to alter the aperture shape in Claisse et al. as taught by Sun et al. to limit the light emission to a particular mode. The Office Action asserts that adding slots would alter the shape of the aperture.

The prior art combination of the Claisse et al. reference with the Sun et al. reference fails to teach each and every claimed element. The prior art combination does not teach or suggest a near field optical apparatus comprising a conductive plane having an aperture therein, said aperture including a plurality of spaced apart slots, and at least one connector region joined to each adjacent said spaced apart slot, at least as claimed in Claim 20. Since each and every claimed element is not taught or suggested in the prior art, then there is no *prima facie* case of obviousness.

The Office Action asserts that determining the exact size and shape of the aperture is optimization and involves routine skill in the art. Applicants respectfully disagree with the assertion in the Office Action. It is asserted that the exact size and shape of the

aperture is not merely routine optimization. It is respectfully requested that the Examiner provide specific citation from the cited prior art or provide an Affidavit to provide evidence to support the assertion. The mere assertion alone is not sufficient to uphold the rejection and is not evidence. Broad conclusory statements standing alone are not evidence. *In re Kotzab*, 55 USPQ2d 1317, (Fed. Cir. 2000).

Regarding claims 21-29, the Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the relative length, width and location of the slots and connector regions since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. The Office Action cites *In re Boesh*, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980). Applicants respectfully disagree with the assertion in the Office Action.

The Office Action has misconstrued the case law regarding result effective variables. The case cited by the Examiner, *In re Boech*, does not hold that discovering an optimum value of a result effective variable involves only routine skill in the art. The holding in the case *In re Boech*, was that the court held that the appellants have failed to rebut a prima facie case of obviousness. The case provides for headnotes that are taken from *In re Antonie*, which states the rule that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill in the art.

A particular parameter first must be recognized as a result-effective variable, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 195 USPQ 6 (CCPA 1977).

The Examiner has the burden of proving with specific evidence from the prior art references the result effective variables. The prior art reference of Sun et al. teaches a method of making an aperture with smooth edges in a consistent manner. The method

taught in the Sun et al. reference can be applied to any arbitrary shape to make smooth edges. However, none of the claimed elements in claims 21-29 are taught or suggested, let alone taught or suggested as result effective variables in any of the cited prior art references.

Claims 30-44 stand rejected under 35 U.S.C. § 103 as being allegedly unpatentable over Applicant's admitted prior art Figure 27 in view of Claisse et al. (U.S. Patent No. 6,084,900) and Sun et al. (U.S. Patent No. 5,915,165). This rejection is respectfully traversed.

The Office Action asserts at Paper number 6, that the Prior Art Figure 27 and the Claisse et al. reference together can be combined to provide a single high order mode laser source. The Office Action admits that both the Prior Art Figure 27 and the Claisse et al. reference together do not teach a protrusion. The Office Action asserts that the Sun et al. reference at Figure 6 teaches multiple aperture shapes. The Office Action asserts that it would have been obvious to alter the aperture shape in the Prior Art Figure 27 in view of the Claisse et al. reference and the Sun et al. reference to limit emission to a particular mode. The Office Action asserts that adding a protrusion would alter the shape of the aperture. Applicants respectfully disagree with the assertions in the Office Action.

The prior art cited in combination does not teach or suggest at least an emission face including an aperture extending through said reflective conductive layer and into at least a portion of said first reflective region, said reflective conductive layer including at least one protrusion which extends into said aperture, at last as claimed in part in Claim 30. Since each and every claimed element is not taught or suggested in the prior art, then there is no *prima facie* case of obviousness.

Additionally, for an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art;

that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

There is no motivation to combine the prior art references. There is no teaching in the prior art that suggests limiting the light emission to a particular mode by way of adding a structural protrusion into the aperture. It is requested that the Examiner specifically cite from the prior art of record to provide evidence to support the assertion and evidence of a motivation to combine the references.

Regarding Claim 37, the Office Action repeats the above argument. The Office Action admits that the Prior Art Figure 27 does not teach the aperture size. The Office Action asserts that it would be obvious to alter the aperture shape. Applicants respectfully disagree.

The prior art does not teach or suggest all of the claim limitations and is silent regarding a semiconductor laser comprising a laser active region; a first conductivity type upper reflective region adjacent an upper side of said active region; a second conductivity type lower reflective region adjacent a lower side of said active region; and an emission facet adjacent said upper reflective region, said emission facet having an aperture therein, said aperture smaller than a guide mode of said semiconductor laser, said aperture extending into at least a portion of said upper reflective region, at least as claimed in Claim 37.

Regarding Claim 31 and 44, the Office Action asserts that the exact size and shape of the aperture is optimization and involves routine skill in the art. Applicants respectfully disagree. It must be shown in the prior art references that altering the size or shape of the aperture is a result effective variable. The Office Action has not provided evidence to support the assertion. Evidence is respectfully requested.

Incorrect Logical Conclusion

Throughout the Office Action the conclusion is drawn that adding a protrusion would alter the shape of the aperture. This conclusion is based on faulty reasoning. On its face, adding a protrusion to an aperture will alter the shape of the aperture. However, there has not been any evidence that the prior art teaches or suggests a protrusion, or adding a protrusion to the aperture. The prior art merely teaches an aperture. The prior art merely teaches a process that consistently creates smooth edges of an aperture for any arbitrary shape. However, there is no teaching or suggestion to add a protrusion to an aperture to create an aperture of special shape. In order to draw the conclusion that the prior art renders the claimed invention obvious requires a teaching of a particular aperture, a teaching of adding the structural protrusion to the aperture and the teaching or motivation to add the protrusion to the aperture for a specific reason. Merely stating that adding a protrusion would alter the shape of the aperture is not sufficient basis for obviousness and does not have logical support from the evidence in the prior art.

Since the Office Action has been traversed and the rejection fails to make out a *prima facie* case of obviousness, Applicant respectfully requests that the Examiner provide specific citation and an Affidavit in support of the assertions in the Office Action that each and every claimed element is rendered obvious.

In view of the foregoing, it is respectfully asserted that the claims are now in condition for allowance.

Dependent Claims

The argument and evidence set forth above is equally applicable here. Since the independent Claims 1, 9, 20, 30 and 37 are allowable, then the dependent Claims 2-8, 10-18, 21-29, 31-36 and 38-44 must also be allowable. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

In view of the foregoing, it is respectfully requested that the rejection be withdrawn and it is respectfully asserted that the claims are now in condition for allowance.

Request for Allowance

It is believed that this Amendment places the above-identified patent application into condition for allowance. Early favorable consideration of this Amendment is earnestly solicited.

If, in the opinion of the Examiner, an interview would expedite the prosecution of this application, the Examiner is invited to call the undersigned attorney at the number indicated below.

Respectfully submitted,
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Dated: October 24, 2002

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The following paragraphs provide the "As Amended" changes in a Marked-up format.

IN THE SPECIFICATION

Marked-up

The paragraph bridging pages 50 and 51.

Referring now to FIG. [28] 29, a vertical cavity surface emitting laser or VCSEL 146 in accordance with the present invention is shown. VCSEL 146 is shown as a GaAlAs device structured and configured for output at approximately 821.9 nm, and it should be readily understood that the layer thicknesses and semiconductor materials used for VCSEL 146 may vary as required for different applications. Thus, VCSEL 146 may be fabricated from various semiconductor materials, including, for example, GaAs, InGaAs, InGaAsP and InP materials, and can be structured and configured to provide various output wavelengths. The thicknesses of various layer components of VCSEL 146 as shown in FIG.[28] 29 are exaggerated for clarity, and the particular layer thicknesses shown are merely illustrative and are not necessarily to scale.

IN THE CLAIMS

Marked-up

1.(Amended) A near field optical apparatus comprising:

a conductive [plane having] layer defining an aperture therein, said aperture having a perimeter;

said conductive [plane] layer having at least one protrusion extending into said aperture at said perimeter, wherein said protrusion into said aperture is configured to produce a transmission mode with very high throughput.

9. (Amended) A near field optical apparatus, comprising:

(a) a light source;

(b) a conductive plane [associated with] proximate to said light source, said conductive plane having an aperture therein positioned such that light from said light source passes through said aperture;

(c) said conductive plane including at least one protrusion which extends into said aperture, wherein said protrusion extending into said aperture forms an aperture shape that produces very high light throughput.

17. (Amended) The near field optical apparatus of claim 9, wherein said light source is a semiconductor laser, and said conductive plane is a metal layer [associated with] proximate to an emission facet of said semiconductor laser.

19. (Amended) A semiconductor laser apparatus comprising an emission facet having a conductive surface, said conductive surface having an aperture therein, said conductive surface including at least one protrusion extending into said aperture, said at least one protrusion and said aperture configured to produce a transmission mode with very high throughput.

20. (Amended) A near field optical apparatus comprising a conductive plane having an aperture therein, said aperture including a plurality of spaced apart slots, and at least one connector region joined to each adjacent said [transverse] spaced apart slot.